

WHAT IS CLAIMED IS:

1. A method for the optional individual or group activation of tipping conveyor elements (3) for a tipping shell sorter (1) traveling on a conveyor system which are each provided with an electric motor tipping drive (9) comprising the steps of;

supplying the electric motor (10) of the electric motor tipping drive (9), with electrical energy transmitted in a contact-free manner,

bringing the electric motor to its idle rated speed ( $n_0$ ), essentially without a load; and,

initiating the tipping process, when the electric motor is essentially in an idle or free-running operation.

2. The method according to claim 1, wherein during said step of initiating the tipping process, the tipping movement of each tipping conveyor element (3) is controlled, so that the maximum electrical output available to electric motor (10) is not exceeded at any time by the power demand during the tipping process.

3. The method according to claim 2, wherein the tipping movement is controlled so that the electric motor (10), which has previously been brought at least essentially to its rated speed ( $n_0$ ) in idle, will produce an output, during and after

said step of initiating the tipping process, by means of a corresponding acceleration of the tipping shell (4) and the piece goods load, that is essentially equal to the maximum power supply,

4. The method according to Claim 3, wherein after the step of initiating the tipping process, said tipping conveyor element (3) to be tipped is essentially permanently accelerated, until it has reached its final tipping position.

5. The method according to claim 4, wherein said tipping conveyor element (3) to be tipped is braked just before it reaches its final tipping position.

6. The method according to claim 5, wherein said tipping conveyor element (3) to be tipped is electromechanically braked in the final tipping phase.

7. The method according to Claim 4, wherein said tipping element (3) to be tipped is essentially accelerated constantly, until it has reached its final tipping position, after said step of initiating the tipping process.

8. A tipping conveyor system for a tipping shell sorter (1), for driven movement along a generally closed loop conveyor guide (5), in a transport direction (12), for targeted, individual delivery of piece goods parts that were previously taken up on at least one take-up station, for subsequent delivery to one of a plurality of target locations (2), in response to a tripping control signal, comprising;

a plurality of tipping conveyor elements (3) connected in tandem with one another in an articulated manner, for movement along the conveyor guide (5), each tipping conveyor element (3) comprising

a non-tippable bottom part (6), slidably disposed on the conveyor guide (5) for movement along the transport direction;

a support means (7) disposed on said bottom part (6) and having a tipping device (11) pivotable about a tipping axis (13) that runs in the transport direction (12) of said tipping conveyor element (3) and including

a support surface (8) mounted on said tipping device (11), in the form of a tipping shell (4) and which in its upright transport horizontal position, supports piece goods parts;

an electric tipping device (9), having an electric motor (10), and coupled to said tipping device (11);

a control device (34) connected to said electric tipping device (9) so that after receiving a tipping control signal,

said electric motor (10) is first brought essentially to its rated idle speed ( $n_0$ ), without initially activating said tipping device (11), and said tipping device (11) is then automatically activated by said control device (34), as soon as said electric motor (10) has reached its rated speed ( $n_0$ ), so that said tipping device (11) and its support surface (8) pivots about said tipping axis (13) into a slanted delivery position toward the target station for delivering of the price good parts contained thereon to the target station.

9. The tipping conveyor system according to claim 8, wherein the maximum electrical output available to said electric motor (10) is not exceeded by the power demand of the system any time during the tipping process.

10. The tipping conveyor system according to claim 9, wherein the tipping movement of said tipping drive (9) is controlled, so that after said electric motor (10), is initially brought to its rated speed ( $n_0$ ), said control device (34) produces an output, during and after initiation of the tipping process by means of corresponding acceleration of said tipping shell device (11) and its piece goods load, that is essentially equal to the maximum power supply.

11. The tipping conveyor system according to claim 10, wherein said tipping device (11) and its support surface (8) are accelerated, after initiation of the tipping process, until they have reached their final tipping position.

12. The tipping conveyor system according to claim 11, wherein said support means (7) includes a braking device, so that said support means (7) with said tipping shell (4) attached to it, as well as the piece goods load disposed on said shell (4), is braked just before reaching the final tipping position.

13. The tipping conveyor system according to claim 11, wherein after initiation of the tipping process, said tipping shell (4) is constantly accelerated after having received a tipping control signal, until reaching its final tipping position.

14. The tipping conveyor system according to claim 8, wherein said tipping device (11), and said control device (34) coupled to it, has a free-running device which, after said tipping conveyor element (3) has received a tipping signal, when said electric motor (10) is being brought up to its rated speed ( $n_0$ ), causes said support means (7) to remain in its upright position, and that said tipping and/or control device are designed so that said support means (7) is automatically tipped out of its

upright transport position into its slanted tipping position, when said electric motor (10) has reached its rated speed ( $n_0$ ).

15. The tipping conveyor system, according to claim 14, wherein said support means (7) has an articulated bearing (14) that is mounted to pivot said support means (7), in limited manner, on its tipping axis (13);

a locking means coupled to said support means (7), wherein said support means (7) can be releasably mechanically locked in its transport position,

a lever arrangement (16) for pivoting, in limited manner, about a second pivot axis (15), disposed parallel to said tipping axis (13), on said support means (7), said lever arrangement (16) having a guide means (17) that is guided in a guide (18) formed in said support means (7) and provided below said support surface (8);

a gear mechanism (19) for connecting said electric motor (10) with said lever arrangement (16) whereby said guide (18) is structured, in a first guide segment (18'), in an arc shape about said second pivot axis (15), so that a rotation of the power take-off axis of said electric motor (10), and therefore of said lever arrangement (16), during the circular movement of said guide means (17) on said arc-shaped first guide segment (18'), about said second pivot axis (15), does not at first result in any tipping movement of said support means (7) and of

the piece goods part supported by it about said second pivot axis (15) or the tipping axis (13);

a second guide segment (18'') that contiguous with and immediately following said first guide segment (18'), and disposed in said support means (7), said second segment (18'') not running in arc shape relative to said second pivot axis (15), but in such a manner that if said electric motor (10), which has been brought up to its rated speed ( $n_0$ ), is rotated further, a torque is exerted on said support means (7) by said lever arrangement (16), which initiates and carries out tipping of said support means (7) about said tipping axis (13).

16. The tipping conveyor system according to claim 15, wherein said lever arrangement (16) comprises two levers (16', 16'') that are disposed at a reciprocal lengthwise distance from one another.

17. The tipping conveyor system according to Claim 16, wherein said levers (16', 16'') are structured essentially in a disk shape.

18. The tipping conveyor system according to claim 16, wherein said levers (16', 16'') are provided with gear teeth on one surface, which engage with a radial gear wheel (21, 21'), whereby said radial gear wheels (21, 21') form said gear

mechanism (19), forming a part of the gear mechanism of said electric tipping drive (9).

19. The tipping conveyor system according to claim 18, wherein said radial gear mechanism (21, 21') has a self-locking device, designed as a worm gear mechanism (22), coupled to said electric motor (10).

20. The tipping conveyor system according to claim 15, wherein said guide means (17) is formed by guide rollers (17') that are each arranged on an end segment of said lever (16' or 16'').

21. The tipping conveyor system according to claim 20, wherein each lever (16', 16'') is provided with a guide roller (17') at its two end segments.

22. The tipping conveyor system according to claim 8, wherein said support means (7), which is screwed to said tipping shell (4) to form said support surface (8) at its top, consists of two essentially disk-shaped segments (7') spaced apart horizontally from one another, and arranged to pivot on said tipping axis (13) so that their longitudinal center axis (23) runs essentially vertically in the upright transport position of said tipping conveyor element (3).



23. The tipping conveyor system according to claim 22, wherein said spaced apart disk-shaped segments (7') of said support means (7) are structured essentially with mirror symmetry, whereby their longitudinal center axis (23) lies in the plane of symmetry.

24. The tipping conveyor system according to claim 15, wherein said second pivot axis (15) is disposed above said tipping axis (13).

25. The tipping conveyor system according to claim 24, wherein said second pivot axis (15) is arranged perpendicular above said tipping axis (13) with respect to the horizontal plane.

26. The tipping conveyor system according to claim 16, wherein said levers (16' and 16'') are structured essentially with mirror symmetry, relative to a center axis that runs through their pivot axis (15).

27. The tipping conveyor system according to claim 16, wherein said two levers (16', 16'') are arranged so that their longitudinal axis, which runs through their two guide means (17, 17'), runs essentially horizontal in the transport direction (12) of said tipping conveyor element (3).

28. The tipping conveyor system according to claim 20, comprising guides (18) that guide said guide rollers (17') and are each formed as recesses in said segments (7', 7') that form said support means (7), and include guide surfaces (25) formed in said segments (7'7'), which essentially run parallel to the surfaces of said segments (7'), and define running tracks for receiving said guide rollers (17', 17').

29. The tipping conveyor system according to claim 8, wherein during the tipping of said support means, said two levers (16', 16'') have a lever pivot angle ( $\alpha$ ) that is approximately 90°, when said support means (7) has a tipping angle ( $\beta$ ) of approximately 35°.

30. The tipping conveyor system according to claim 8, wherein in the free-running operation with a support means tipping angle  $\beta = 0^\circ$ , said lever pivot angle ( $\alpha$ ) is approximately 10°.

31. A tipping conveyor system as recited in claim 8 comprising;  
a stationary conductor (31) disposed along the conveyor  
guide (5) in the transport direction (12);

a pick up element (33) disposed on each of said conveyor  
elements (3) adjacent to said stationary conductor for receiving  
electromagnetic energy and control signals from said stationary  
conductor, said pick up element (33) being connected to said  
control device (34) for providing electrical power to said  
electric tipping device (9) and said motor(10).

32. A tipping conveyor system as recited in claim 31  
additionally comprising a central computer coupled to said  
stationary conductor (31) for providing control and tipping  
signals to said control device (34).

33. A tipping conveyor system as recited in claim 32 further  
comprising

a transmitter disposed adjacent to said target location and  
coupled to said computer for sending a tipping signal to said  
control device.

34. A tipping conveyor system as recited in claim 32, wherein  
each of said conveyer elements is individually coded, and  
comprising

a reading device (35) directed at one of said conveyor  
elements (3) and connected to said computer (30) for reading the  
code on said conveyer element (3) as it approaches a target  
station.

35. A tipping conveyor system for a tipping shell sorter (1), for driven movement along a generally closed loop conveyor guide (5), in a transport direction (12), for targeted, individual delivery of piece goods parts that were previously taken up on at least one take-up station, for subsequent delivery to one of a plurality of target locations (2), in response to a tripping control signal, comprising;

a plurality of tipping conveyor elements (3) connected in tandem with one another in an articulated manner, for movement along the conveyor guide (5), each tipping conveyor element (3) comprising

a pivotable tipping element, pivotable about a tipping axis (13) that runs in the transport direction (12) disposed in each conveyor element (3)

and having a support surface (8) in the form of a tipping shell (4) and which in its upright transport horizontal position, supports piece goods parts;

an electric tipping drive coupled to said tipping element;

a programmable computer (30) for selectively determining the target stations for each of said conveyor elements (3) and providing tipping control signals;

a control device (34) connected to said electric tipping drive and responsive to said programmable computer (30) so that after receiving a tipping control signal, said electric tipping drive of an individual conveyor element (3) is first brought to its rated idle speed ( $n_0$ ), without initially activating said tipping element, and said tipping element is then automatically

- activated by said control device (34), as soon as said electric tipping drive has reached its rated speed ( $n_0$ ), so that said tipping drive and its support surface (8) pivots about said tipping axis (13) into a slanted delivery position toward the target station for delivering of the price good parts contained thereon to the target station during the movement of said conveyor system.